

Notice of Allowability

Application No.

10/666,865

Examiner

Jennifer M. Dolan

Applicant(s)

KIM, MIN-SU

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amdt. of 2/2/06.
2. ☒ The allowed claim(s) is/are 1-8.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 10/096,185.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other



DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2 February 2006 has been entered.

Allowable Subject Matter

2. Claims 1-8 are allowed.
3. The following is an examiner's statement of reasons for allowance:

The primary reason for allowance is the limitation that the device isolation layer consists of a well having a lower surface in contact with the upper surface of the buried oxide (BOX) layer and a field oxide film disposed on an upper surface of the well, wherein the well includes additional impurity ions compared to the active area (claims 1-3 and 7-8) and the limitation that the local interconnect/metal fill contacts with the upper surface and the sidewall of the gate line (claims 4-8), in addition to the other limitations in the claims.

The closest prior art for the general structure of the claimed invention includes U.S. Patent No. 6,424,011 to Assaderaghi et al., which teaches an SRAM structure including all of the claimed elements, except that a full trench isolation (the isolation structure occupies the entirety

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of the device isolation region and does not include an underlying semiconductor well), as opposed to the claimed partial trench structure, and the local interconnect line contacts only the top of the gate through an etched hole. There is no disclosure in the prior art of providing a local interconnect that contacts the top and sides of the gate line as claimed (claims 4-8), but rather, the prior art teaches structures wherein the local interconnect is disposed well above the gate and only contacts the gate through small vias. Since the claimed structure allows for a more reliable and lower resistance connection between the gate line and the local interconnect without risking inadvertent etching of the field oxide film or shorting between the interconnect and the underlying features, it is the Examiner's opinion that the claimed gate line structure would not have been obvious to a person having ordinary skill in the art.

Additionally, although the prior art of record provides numerous teachings of partial trench isolation for similar SOI structures, such as those in US 5,767,549 to Chen et al., US 6,455,894 to Matsumoto et al., or US 6,215,155 to Wollesen, in each of these cases, the semiconductor layer formed under the field oxide is formed with the same doping level (and of the same implant) as the active region, rather than being formed as a separate implant. Hence, the prior art wells in the device isolation region do not meet the claimed limitation of including additional impurity ions compared to the active regions. Since the claimed well structure (claims 1-3 and 7-8) including the additional impurity atoms facilitates discharging of accumulated holes in the body region, thus reducing floating body effects, it is the Examiner's opinion that the claimed invention is critical and unobvious to a person having ordinary skill in the art.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Dolan
Examiner
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